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EFFECT OF COLLABORATIVE CONCEPT MAPPING STRATEGY ON ACHIEVEMENT IN ECONOMICS OF IX GRADERS

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ABSTRACT

The Study was intended to investigate the effect of teaching through collaborative concept mapping strategy on the achievement in Economics. Sample of the study consisted of 600 (300 experimental group and 300 controlled group) IX class students from two Government secondary schools of Moga district of Punjab, India. Experimental group was exposed to collaborative concept mapping strategy and the controlled group was exposed to conventional method (lecture and discussion). Mixed Type Group Test of Intelligence (MGTI) (2012) by Mehrotra was used to match the groups. Achievement test in Economics (developed and standardized by the investigator) was used as tool for data collection. The results of the study showed that achievement in Economics of the group exposed to collaborative concept mapping strategy was significantly more as compared to group taught by conventional method.

KEYWORDS: Collaborative concept mapping strategy, experimental group, controlled group, achievement in Economics.

Introduction

In the past two decades, many new instructional strategies that are applicable to cooperative and collaborative learning have been proposed and intensively researched. These strategies include: reciprocal teaching (Palincsar & Brown, 1985), project-based learning (Marx, Blumenfeld, Krajcik, & Soloway, 1997), problem-based learning (Koschmann, Kelson, Feltovich, & Borrows, 1996), and learning by design (Kolodner, Crismond, Gray, Holbrook, & Puntambekar, 1998), to name just a few. When placed in a more dynamic learning environment and given a more active role, learners engage in high-order thinking skills. This transpires while they work together and learning occurs at a deeper level.

Concept mapping has been found to be an effective tool for individual learning (Horton et al., 1993). Similarly to other successful individual focused strategies. Researchers have made attempts to apply the concept mapping strategy to collaborative learning situations. Collaborative concept mapping occurs when a pair or a group of students work together to develop a concept map. Benefits to learners, at the both the individual and group level, include quality group interaction, better products, and better individual learning outcomes (Boxtel, Linden, & Kanselaar, 2000; Roth & Roychoudhury, 1992, 1993; Sizmur & Osborn, 1997).

Collaborative concept mapping is an activity in which concept mapping is applied to collaborative learning situations. Thus, it can be defined along the lines of collaborative learning. Collaborative learning, broadly defined, is "a situation in which two or more people learn or attempt to learn something together" (Dillenbourg, 1999). However, the three components in this definition ("two or more people," "learning," and "together") do not guarantee the existence of collaboration among group members. Achieving collaboration requires coordinated and continued efforts from all participants in order to arrive at a shared conception (Teasley & Roschelle, 1995). Such efforts and their products are evidenced in the students' actins, in the interactions of the learners (Barron, 2000; Roschelle, 1992; Teasley & Roschelle, 1995), and through discussions between students and instructors (Roth & Roychoudhury, 1993, 1994). In this study, collaborative concept mapping is defined as a process in which two or more students engage in coordinated and sustained efforts to create one or more concept maps. The goal of their cooperation is to learn and construct knowledge. This learning and construction of knowledge is taken as achievement in Economics.

Achievement in Economics refers not only to obtaining excellent marks in the greater level final examination but it also refers to the attainment of the Economic ability and skills. Achievement of the pupil refers to the knowledge attained and skill developed through school subjects which are assessed by school authorities with the help of the achievement tests. Here achievement in Economics is considered as mean gain scores obtained by the students in the achievement test in Economics. Achievement in Economics depends upon many factors. Intelligence and study habits are among the main factors associated with achievement of the individual.

Emergence of the problem

Sizmur and Osborne (1997), Hwang et al (2006), Preszler (2004) found that collaborative concept mapping improved learning outcome whereas Carter (1998), Ledger (2003) concluded that collaborative concept mapping did not have significant effect on learning outcome.

Most of the work which has been done on collaborative concept mapping is confined to other countries (Roth & Roychoudhury, 1993; Ostwald, 1996; Sizmur & Osborne, 1997; Carter, 1998; Ledger, 2003; Freeman, 2000; Boxtel et al., 2002; Chiu, 2003; Hwang, Chu, & Liang, 2006). As far as effect of concept mapping strategies on achievement in Economics is concerned only three studies- Chiou (2006), Marangos (2003) and Marangos and Alley (2007) were found by the investigator. No study was found by investigator conducted on the population of Punjab (India). So the proposed study seems fully justified.

Objective

To investigate the significance of difference in achievement in Economics of the groups taught through collaborative concept mapping and traditional method.

Hypothesis

There will be no significant difference in achievement in Economics of the groups taught through collaborative concept mapping and traditional method

Design of the study : To study the effectiveness of collaborative concept mapping strategy on the achievement, randomized groups pre-test post-test design was used.

In phase-I, the groups were framed randomly, one group was considered as experimental group and the other as the control group. Both the groups were given pre-test of achievement; both the groups were matched on the basis of achievement (pre-test) and intelligence. In phase-II, experimental group was exposed to treatment by teaching through collaborative concept mapping strategy for a period of 30 days where as control group was exposed to treatment by teaching through lecture method. In phase-III, study consisted of post-testing i.e. a post test of achievement was given to both the groups. The analysis was carried out on the gain scores.

Independent variables: Collaborative concept mapping strategy and traditional (lecture method) method were the independent variables in the study.

Dependent variable: Achievement in Economics is the dependent variable in the study.

Control: Following steps were taken to control the extraneous variables:
(a) Selection of sample: Random sampling was done. Two groups were formed in each school and one group was randomly taken as experimental and the other controlled group.

(b) Matching the groups: Both the groups experimental and controlled were matched on the basis of intelligence.

(c) Prior knowledge: Achievement in Economic was administered on both the groups as pretest (before experiment) and posttest (after experiment). The analysis was done on the gain score (Posttest – pretest) to check the prior knowledge of the students.

(d) School environment: The experiment was conducted on the Government schools, theses schools have similar environment. So the school environment factor was nullified.

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(e) Teacher: Single teacher conducted the whole experiment. Thus the teacher variations were eliminated.

(f) Medium of instruction: Teacher made the students comfortable with respect to medium. The students were taught in their medium of instruction; majority of them had Punjabi as their medium of instruction.

Sample of the study: For the present study, sample of 600 (300 in experimental and 300 in controlled group) students of 9th class of 5 Government Schools were selected through the multistage randomization technique from Moga district. Equal representation was given to male and female students in the sample.

Tools used: Following tools were used:
(a) Achievement test in Economics developed by the investigator.

(b) Mixed Type Group Test of Intelligence (MGTI) (2012) by Mehrotra

Matching of the groups: Mixed type of group test of intelligence (2012) by Mehrotra was used to match the groups. Mean, standard deviation and t-ratio was calculated and the values are given in table 1 below:

Table 1: Matching the groups on the basis of Intelligence

Groups	N	Mean	Standard Deviation	t-ratio
Controlled group	300	58.40	11.23	0.75 (N.S.)
Experimental group	300	59.07	10.72	

N.S. means non-significant

Table 1 reveals that mean score of the controlled group (group taught through Traditional Method) in Intelligence is 58.80 and standard deviation for the same is 11.23 whereas mean scores of the experimental group (group taught through Collaborative Concept Mapping method) in Intelligence is 59.07 and standard deviation for the same is 10.72. The value of t-ratio came out to be 0.75 which is non-significant. Thus there exists no significant difference in both the groups with respect to Intelligence.

Result and discussion: For testing hypothesis 'There will be no significant difference in the achievement in Economics of the group taught through traditional method of teaching and group taught through collaborative concept mapping', t-ratio was worked out on achievement in Economics (Gain scores) of controlled and experimental groups. The values are given in Tables 2(a) and 2(b).

Table 2 (a): t-test
Group Statistics

	Groups	N	Mean	Standard Deviation
Gain Scores	Controlled Group	300	1.62	0.95
	Experimental Group	300	3.60	1.94

Table 4.3 (a) reveals that values of mean for controlled group and experimental group are 1.62 and 3.60 respectively.

Table 2 (b): Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Gain Scores	Equal variances assumed	7.45	0.29	15.84	598	0.00	1.98	0.12	2.22	1.73
	Equal variances not assumed			15.82	596.84	0.00	1.98	0.12	2.22	1.73

On application of F–test through SPSS Table 4.3 (b) table of independent sample test is obtained, this table reveals results of two tests-Levene's Test for equality of variances and t-test for equality of means. The table contains two sets of analysis, the first one assuming equal variances in the two groups and the second one assuming unequal variances. The Levene's test tells which statistics to be considered to analyze the equality of the means. It tests the equality of variance; a large value of significance associated with Levene's Test indicates that the two groups have equal variances. In the above table, F value is 7.45 which is non-significant at 0.05 level of significance. It indicates that the two groups have equal variances. Therefore, the statistics associated with equal variances assumed should be used for the t-test for equality of means.

The t-test results (with equal variances assumed) show t statistic of 8.48 with 300 degrees of freedom the corresponding two tailed p-value is 0.00, which is less than 0.01. Therefore we can reject the null hypothesis (There will be no significant difference in Achievement in Economics of the groups taught through Co-operative Concept Mapping and Conventional teaching) at 1% level of significance, which means that the Achievement in Economics of the groups taught through Co-operative Concept Mapping and Conventional teaching are significantly different. The Achievement in Economics of experimental group (Mean=3.6) is thus significantly higher as compared to controlled group (Mean=1.62).

This finding is well supported by the studies conducted by Sizmur and Osborne (1997), Hwang et al (2006), Preszler (2004).

Achievement in Economics of group taught through Concept Mapping is significantly higher as compared to group taught through traditional method. There is empirical support for the use of mapping in enhancing, retaining and improving knowledge (Davis, 2010). Cognitive Science shows that visual display enhances learning (Winn, 1991; Vekiri, 2002). For many people maps are much easier to follow, it promotes deep and not surface approaches to learning (Biggs, 1987; Ramsden, 1992). The work involved in mapping requires more active engagement on part of the learner which leads to greater learning (Twardy, 2004). Students' attention improved as they drew concept maps in cooperative groups and in their discussions on the application of learnt concepts to real life situations (Patriciah, Johnson, & Francis, 2014).

Implications
Results of the study revealed that co-operative concept mapping is better technique than conventional teaching. It is thus suggested that co-operative concept mapping can be utilized for teaching Economics. Students are able to under the Economic concept better achieve more when involved in co-operative concept mapping.

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